



INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(51) International Patent Classification ⁶ : H04N 5/262	A1	(11) International Publication Number: WO 97/26757 (43) International Publication Date: 24 July 1997 (24.07.97)
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(21) International Application Number: PCT/US97/00460

(22) International Filing Date: 16 January 1997 (16.01.97)

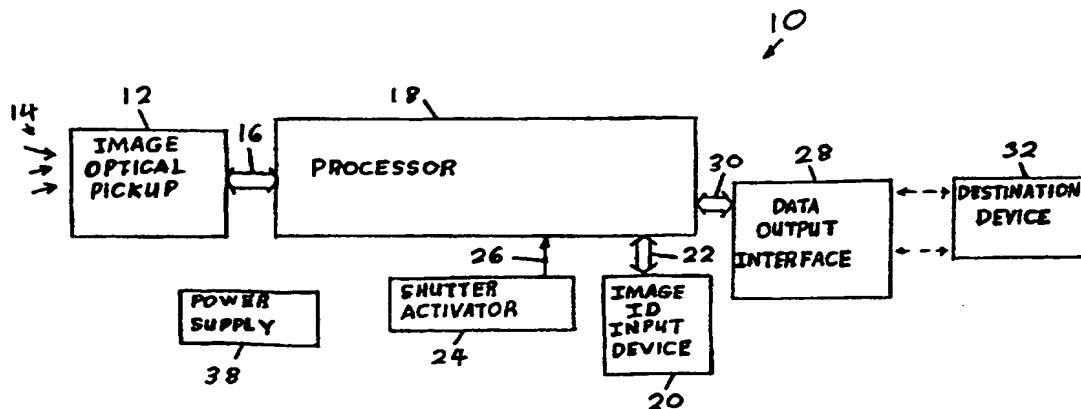
(30) Priority Data:
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floor, 160 W. Santa Clara Street, San Jose, CA 95113 (US).(81) Designated States: CA, JP, European patent (AT, BE, CH, DE,
DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE).

Published

With international search report.

COPY

(54) Title: ELECTRONIC DIGITAL CAMERA WITH IMAGE IDENTIFICATION



(57) Abstract

An electronic still image digital camera (10) having a processor (18) programmed to contain a variety of data selections. Upon activation of the camera (10), a list of the data selections is displayed on a touch LCD display. The camera operator can then select from the provided data selections to input a descriptive image identifier for a particular still image to be recorded by the digital camera (10). The camera (10) creates digital image data corresponding to the particular still image, and image identifier data corresponding to the selected image identifier. This data can then be outputted, for example through a PCMCIA slot to a PCMCIA memory card.

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1 Specification

2 ELECTRONIC DIGITAL CAMERA WITH IMAGE IDENTIFICATION

3 BACKGROUND OF THE INVENTION4
5 Field of the Invention

6 The present invention relates generally to an electronic
7 still video camera, and more particularly to an electronic
8 still video camera having a touch LCD display through which
9 an operator can enter data for input to the camera for
10 identifying each recorded image, the camera operating to
11 output the identification data with the image data so as to
12 uniquely identify each image recorded.

13
14 Brief Description of the Prior Art

15 Descriptive and accurate identification of an image
16 recorded by an electronic still camera is a problem in a
17 number of fields of use. For example, a real estate agent may
18 take numerous pictures of a number of different dwellings on
19 a single day, all stored on a single disk. In order to
20 accurately identify each picture, the agent needs to keep a
21 separate log with a high degree of accuracy in order to avoid
22 subsequent mis-labeling of the pictures. A single omission
23 could result in chaos if the particular point of error is not
24 known.

25 The insurance field has a similar problem in taking
26 pictures at accident sites. Each picture needs to be
27 carefully identified with descriptive data as to view, angle,
28 etc. In both of these fields and possibly others, a large
29 amount of clerical work is required to keep the pictures
30 organized and properly identified for use in record books and
31 reports. In addition to the high cost of record keeping, there
32 is always the problem of identification of a misplaced photo.

33 There is clearly a need for some kind of label that is
34 permanently associated with each recorded image. Such a label
35 would avoid the possibility of confusion due to error in
36 keeping an auxiliary/companion log book, and would minimize

1 the large amount of clerical time currently spent in keeping
2 records for photo identification.

3
4 SUMMARY OF THE INVENTION

5 It is therefore an object of the present invention to
6 provide an electronic still video camera that allows a user
7 to record selected image identification information along with
8 each recorded image.

9 It is a further object of the present invention to
10 provide an electronic still video camera with a touch LCD
11 display for user input of an image identifier selected from
12 a variety of data selections.

13 It is a still further object of the present invention to
14 provide an electronic still video camera having push buttons
15 for user input of an image identifier.

16 Briefly, a preferred embodiment of the present invention
17 includes an electronic still image digital camera having a
18 processor programmed to contain a variety of data selections.
19 Upon activation of the camera, a list of the data selections
20 is displayed on a touch LCD display. The camera operator can
21 then select from the provided data selections to input a
22 descriptive image identifier for a particular still image to
23 be recorded by the digital camera. The camera creates digital
24 image data corresponding to the particular still image, and
25 image identifier data corresponding to the selected image
26 identifier. This data can then be outputted, for example
27 through a PCMCIA slot to a PCMCIA memory card.

28 An advantage of the present invention is that it
29 eliminates the need to keep a separate record for identifi-
30 cation of pictures taken with an electronic digital camera.

31 Another advantage of the present invention is that it
32 avoids loss of identification of a particular image.

33 A further advantage of the present invention is that it
34 reduces clerical work otherwise required to correlate and keep
35 records of pictures and their identification.

IN THE DRAWINGS

Fig. 1 is a block diagram of an electronic digital camera having an image identification input device by which a user can enter specific image identifier data;

Fig. 2 is a preferred embodiment of the processor of Fig. 1;

Fig. 3 is a preferred embodiment of the image input interface circuit of Fig. 2;

Fig. 4 is a preferred embodiment of the memory of Fig. 2; Figs. 5 and 6 illustrate a preferred embodiment of the image ID input device of Fig. 1; and

Fig. 7 is a flow chart of the operation of the electronic digital camera with image identification.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring now to Fig. 1 of the drawing, there is shown a block diagram of an electronic digital camera 10 according to the present invention, having a facility for allowing an operator to enter an image identifier for each individual recorded image. There is an image optical pickup 12 for receiving light images 14 and converting them to a corresponding analog electric signal which is transmitted through bus 16 to a processor 18. The processor 18 is further interconnected to an image ID input device 20 through bus 22, and to a shutter activator 24 by way of line 26. Data is transmitted from the processor 18 through a data output interface 28 by way of bus 30. Fig. 1 also shows a destination device 32 and a power supply 34. The terms "signal" and "data" will be used somewhat interchangeably throughout the following text. The term "signal" will generally be used when referring to electrical waves being propagated along some transmission means, and the term "data" will be used when referring to the stored digital information. In any case, the meaning of "signal" or "data" will be apparent to those skilled in the art, and the specific term used will not be controlling as to the meaning.

1 Referring again to Fig. 1, in operation the processor 18
2 responds to the shutter activator 24 by converting the analog
3 electric signal and storing it as digital image data. In
4 addition, the processor 18 stores data selections for output
5 to the image ID input device, which displays the data
6 selections so an operator can create an image identifier for
7 a particular image/picture. The data selections can be in the
8 form of names, name segments, and/or optional menus or
9 keyboard characters as alternate embodiments of the invention.
10 Various possibilities of menus and lists and their display
11 will be understood by those skilled in the art, and these are
12 included in the spirit of the invention. Upon operator
13 selection of an image identifier from the data selections, the
14 corresponding image identifier data is entered into the
15 processor 18, and subsequently made available for output
16 through the data output interface 28 along with the
17 corresponding digital image data for reception by a destina-
18 tion device 32. Power for the camera 10 is supplied by way
19 of the power supply 34 through interconnections which are not
20 shown.

21 The image optical pickup 12 converts the light 14 to the
22 analog electric signal when a user operates the shutter
23 activator 24. The preferred embodiment of the pickup 12 is
24 a charge coupled device, but other types of pickups are also
25 included in the spirit of the present invention, such as
26 infrared or ultraviolet sensors. The pickup 12 receives
27 horizontal, vertical, and electronic exposure signals from the
28 processor 18, and sends the analog electric signal to the
29 processor 18 by way of bus 14.

30 Fig. 2 shows a preferred embodiment of the processor 18.
31 [The interface circuit 36 stores a reference signal and the
32 raw analog electric signal, received from the pickup 12
33 through bus 16, and outputs the refined corresponding digital
34 image signal to an integrated multiprocessor 38 by way of bus
35 40. These operations are performed in response to a digital
36 interface circuit command signal and a timing activation

1 signal from the integrated multiprocessor 38, received by way
2 of bus 40.]

3 The integrated multiprocessor 38 responds to the shutter
4 activator 24, interconnected through line 26. The
5 multiprocessor 38 performs the operation of sending the
6 interface circuit command signal and the timing activation
7 signals to the interface circuit 36, and receiving the digital
8 image signal from the interface circuit 36. The
9 multiprocessor 38 acts upon the digital image signal from bus
10 40, and the image identifier signal received from the image
11 ID input device 20 through bus 22, and stores the information
12 content of the signals as data in memory 42, interconnected
13 by bus 44. The data is subsequently passed by the
14 multiprocessor 38 through bus 46 to the data output interface
15 28. The interface 28 provides interconnection to a
16 destination device 32 for receiving the digital image data and
17 image identifier data. The preferred embodiment of the
18 present invention uses a PCMCIA slot for the data output
19 interface 28 for interconnection to a PCMCIA memory card
20 destination device. Other types of data output interfaces for
21 other destination devices are included in the spirit of the
22 invention, including for example an output to a 3.5-inch
23 diskette destination device, output to a computer network,
24 output to a modem, or a serial or parallel port for output to
25 a computer.

26 The integrated multiprocessor 38 is preferably a single
27 chip system containing a processor, PCMCIA controller, memory
28 controller, communications processor, LCD controller, timers,
29 interrupt controller, and serial ports. An example of such
30 a multiprocessor is the Motorola MPC 821. Other equivalent
31 parts are included in the spirit of the invention.

32 The memory 42 is programmed to store the data selections,
33 including a selection of name segments that the
34 multiprocessor 38 makes available to an operator through use
35 of the image ID input device 20. The chosen data selections
36 for a particular image are recorded by the multiprocessor 38

1 in memory 42 and then transmitted through the data output
2 interface 28 to the destination device 32.

3 Referring to Fig. 3, a preferred embodiment of the image
4 interface circuit 36 is shown in more detail. The circuit 36
5 includes a correlated double sampler (CDS) 48 with an input
6 line 50 from bus 16, an input 52 from a digital to analog
7 converter (D/A) 54 and an output 56 to an analog to digital
8 converter (A/D) 58. The A/D converter 58 has an output 60 to
9 bus 40, and the D/A converter 54 has an input 62 from bus 40.
10 There is also a timing generator 64 with an input 66 from bus
11 40, and an output 68 to bus 16.

12 The CDS circuit 48 has two sample and hold circuits (not
13 shown) connected to the inputs of a differential amplifier
14 (not shown). One sample and hold circuit stores a reference
15 signal from the pickup 12 received through line 50, while the
16 other sample and hold circuit stores the raw image signal from
17 the pickup 12, also through line 50. The CDS circuit 48, in
18 response to an analog signal received by way of line 52 from
19 the D/A convertor 54, outputs a refined, corrected image
20 signal on line 56. The details of the CDS circuit are well
21 known to those skilled in the art and need not be described
22 in detail here. The A/D converter 58 converts the output from
23 the CDS circuit to a digital signal and sends it to the
24 multiprocessor 38 via line 60.

25 The timing generator 64 in response to a signal on line
26 66 from the multiprocessor 38, outputs a proper timing signal
27 to the pickup 12.

28 Fig. 4 shows a preferred embodiment of the memory 42 as
29 having a separate frame buffer 70 with an input-output sub-bus
30 72 joining bus 44, and a flash memory 74 with an input-output
31 sub-bus 76 also joining bus 44. The frame buffer 70 is
32 preferably a high speed memory system capable of recording CCD
33 image data at over 10 million samples per second. The flash
34 memory 74 is preferably a large memory circuit that exhibits
35 fast read timing, but slower write timing. The flash memory
36 74 is also used to store application software for the camera
37 10.

1 As briefly discussed above, the memory 42 is programmed
2 to store various data selections which are sent by the multip-
3 rocessor 38 to the ID input device 20, from which an operator
4 can create a particular image identifier. The ID input device
5 20 could take on many forms in the spirit of the present
6 invention, such as a conventional keyboard. It could also be
7 an input device such as a remote control with a keyboard, the
8 remote control emitting a radiated signal carrying the input
9 information to a receiver on or in the camera. Such
10 technology is well known to those skilled in the art, such as
11 in the use of remote controls for television, etc. A
12 preferred embodiment of the ID input device 20 according to
13 the present invention is a touch LCD display 78 as illustrated
14 in Figs. 5 and 6. The multiprocessor 38 outputs data
15 selections to the LCD display 78, and the operator makes his
16 particular selections by pressing the corresponding area,
17 which causes the coordinates of that location to be sent to
18 the multiprocessor 38. The example shows three general
19 categories of name segments in Fig. 5, including residential
20 80, automobile 82, and keyboard 84. For example, if the
21 operator pushed area 82 corresponding to automobile, a display
22 such as Fig. 6 would be presented, or alternatively, the first
23 row of Fig. 6 could be displayed from which the operator would
24 make a selection of a particular list for either 2-door 88,
25 4-door 90, or station wagon 92 listings. The group of name
26 segments 89 in Fig. 6 is an example of name segments that
27 could be displayed as a result of pushing the 4-door area 90.
28 If additional data needed to be entered to create a proper
29 image identifier, the operator could push area 94 for a new
30 selection (NEWSEL), which would result in the display of Fig.
31 5 again. According to the example of Fig. 6, when the
32 operator has completed the selection of an identifier, the
33 operator pushes the enter area 96, and the processor causes
34 the image identifier data to be written in the memory 42, and
35 associated with the particular image to be recorded. As an
36 additional feature, the cancel 95 area with corresponding
37 programming in the camera can be provided. If the operator

1 makes an error in selection, he can start over by pushing this
2 area. The image data and identifier data are subsequently sent
3 through the interface 28 to the destination 32. The image
4 data and image identifier data stored in memory 42 can be
5 automatically sent to the destination device 32, or can be
6 sent upon operator inputting a transmit command, which can be
7 accomplished in a number of ways, such as through use of a
8 transmit button 98. The above description of the display
9 given in Figs. 5 and 6 is by way of example, and many other
10 variations will be apparent to those skilled in the art.

11 The operation of the electronic digital camera with image
12 identification is displayed in the flow chart of Fig. 7.
13 Operation begins when a user implements the shutter activator
14 24 of Fig. 1. This is indicated in block 100 of Fig. 7 as a
15 shutter button. Although the preferred embodiment for the
16 shutter activator is a shutter button, other kinds of devices
17 known to those skilled in this art are included in the spirit
18 of the present invention, such as various kinds of remote
19 control devices.

20 Pressing the shutter button activates the multiprocessor
21 38 to power up and initialize the hardware, as indicated by
22 block 102. The multiprocessor 38 sends a signal to the timing
23 generator 64 (Fig. 3) which outputs a signal to activate the
24 optical pickup 12, which is preferably a charge coupled device
25 (CCD). Image data is then sent to the frame buffer 70 (Fig.
26 4) as previously explained and now illustrated as block 104
27 in Fig. 7. The multiprocessor 38 performs a test for exposure
28 and if it is not within pre-set limits, an adjustment signal
29 is sent back to the image interface circuit 36 to adjust the
30 shutter of the pickup 12 and send a new image, i.e. analog
31 electric signal. This is indicated by the decision block 106
32 and feedback block 108. When the exposure meets the pre-set
33 conditions, the multiprocessor 38 causes the data selections,
34 such as name segments, to be entered on the display, the
35 preferred embodiment being an LCD touch display, as previously
36 described, the operation now indicated in block 110 of Fig.
37 7. The user enters the desired image identifier data as

1 previously explained in reference to Figs. 5 and 6, or by
2 means of other alternate input devices known to those skilled
3 in the art. This is indicated by block 112. The
4 multiprocessor then constructs the image identifier (data),
5 described as a picture file name in block 114, from the user
6 inputs (image identifier data) indicated by block 114, and
7 sends the picture with the user-supplied identifier (image
8 identifier) through the data output interface to the destina-
9 tion device. This is indicated as block 116, with specific
10 reference to writing the picture with filename (image
11 identifier) to the preferred destination device, noted as a
12 PCMCIA card in block 116. This completes the picture-taking
13 sequence and the processor turns off the power, as indicated
14 in block 118. Alternatively, the camera can be turned on or
15 off with a manual, user-operated on/off switch or other means
16 well known to those skilled in the art.

17 Although a preferred embodiment of the present invention
18 has been described above, it will be appreciated that certain
19 alterations and modifications thereof will be apparent to
20 those skilled in the art. It is therefore intended that the
21 appended frames be interpreted as covering all such
22 alterations and modifications as fall within the true spirit
23 and scope of the invention.

24 What is claimed is:

25

1
2

CLAIMS

- 1 1. An electronic digital camera comprising:
2 a) means for receiving a light image and recording a
3 corresponding digital image data; and
4 b) means for user input of image identifier data to said
5 camera to identify said light image.
- 1 2. An electronic digital camera as recited in claim 1 further
2 comprising:
3 means for outputting said digital image data and said
4 image identifier data.
- 1 3. An electronic digital camera as recited in claim 2 wherein
2 said means for outputting includes a PCMCIA slot for
3 outputting to a PCMCIA card.
- 1 4. An electronic digital camera as recited in claim 1 wherein
2 said means for user input of said image identifier data
3 includes touch LCD display means including an LCD display upon
4 which is displayed data selections from which said user can
5 input said image identifier data.
- 1 5. An electronic digital camera as recited in claim 4 further
2 comprising
3 means for outputting said digital image data and said
4 image identifier data.
- 1 6. An electronic digital camera as recited in claim 5 wherein
2 said means for outputting includes a PCMCIA slot for
3 outputting to a PCMCIA card.
- 1 7. An electronic digital camera comprising:
2 a) an image optical pickup for receiving light and
3 outputting a corresponding analog electric signal;

4 b) a shutter activator for activating said electronic
5 digital camera;
6 c) an image identification input device for operator
7 input of image identifier data to said electronic digital
8 camera for identifying said image;
9 d) a data output interface;
10 e) signal processing means responsive to said shutter
11 activator to power up and initialize said camera, and to
12 provide a control signal to said image optical pickup for
13 exposure control, and to receive said analog electric signal
14 and convert said analog electric signal to corresponding
15 digital image data, and to output said image data and said
16 image identifier data to said data output interface for
17 transmission to a destination device.

1 8. An electronic digital camera as recited in claim 7 wherein
2 said data output interface is a PCMCIA slot for transmission
3 of said digital image data and said image identifier data to
4 a PCMCIA card destination device.

1 9. An electronic digital camera as recited in claim 7 wherein
2 said signal processing means provides data selections to
3 said image identification input device, whereby said operator
4 can select specific combinations of said data selections to
5 input as said image identifier data.

1 10. An electronic digital camera as recited in claim 9 wherein
2 said data output interface is a PCMCIA slot for transmission
3 of said digital image data and said image identifier data to
4 a PCMCIA card destination device.

1 11. An electronic digital camera as recited in claim 9 wherein
2 said data output interface is an output for transmission of
3 said digital image data and said image identifier data to a
4 computer network.

1 12. An electronic digital camera as recited in claim 9 wherein
2 said data output interface is an output for transmission of
3 said digital image data and said image identifier data to a
4 modem.

1 13. An electronic digital camera as recited in claim 9 wherein
2 said data output interface is a serial output for transmission
3 of said digital image data and said image identifier data to
4 a computer.

1 14. An electronic digital camera as recited in claim 9 wherein
2 said data output interface is a parallel output for
3 transmission of said digital image data and said image
4 identifier data to a computer.

1 15. An electronic digital camera as recited in claim 7 wherein
2 said image identification input device is a touch LCD display.

1 16. An electronic digital camera as recited in claim 7 wherein
2 said image identification input device is a remote control
3 device.

1 17. An electronic digital camera as recited in claim 7 wherein
2 said remote control device contains a touch LCD display.

10

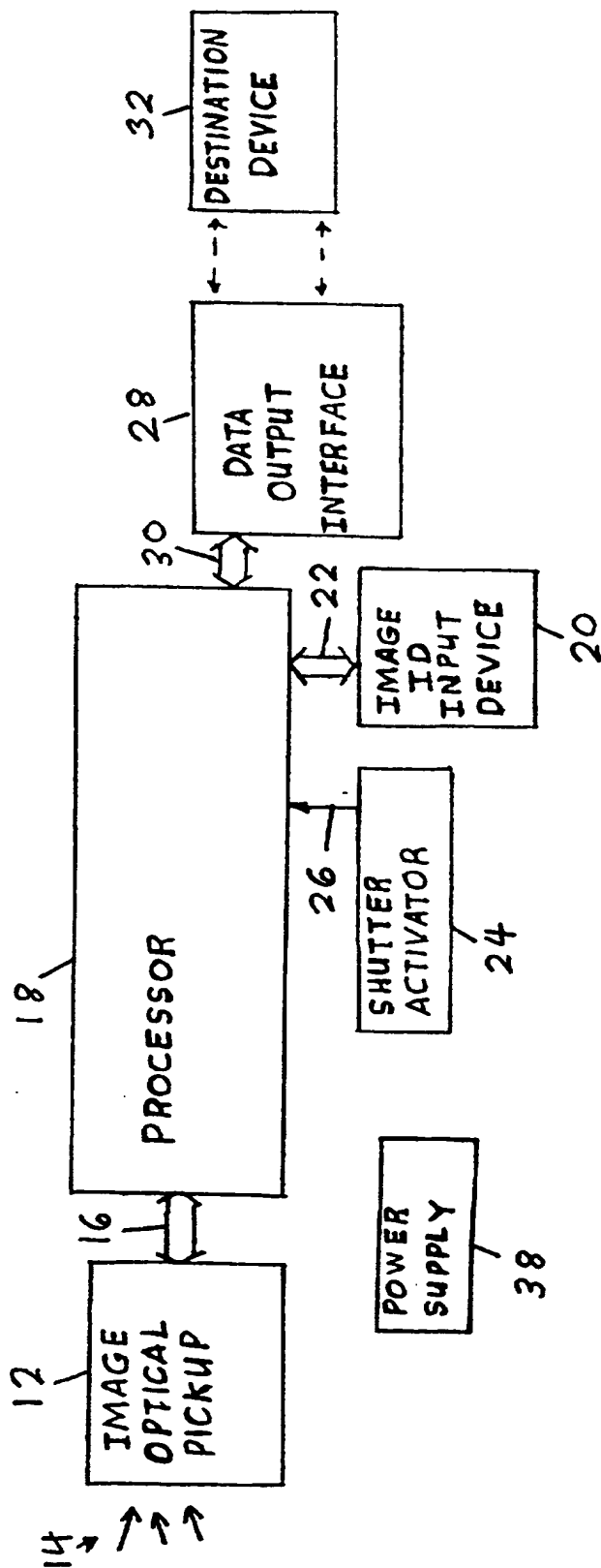


FIG 1

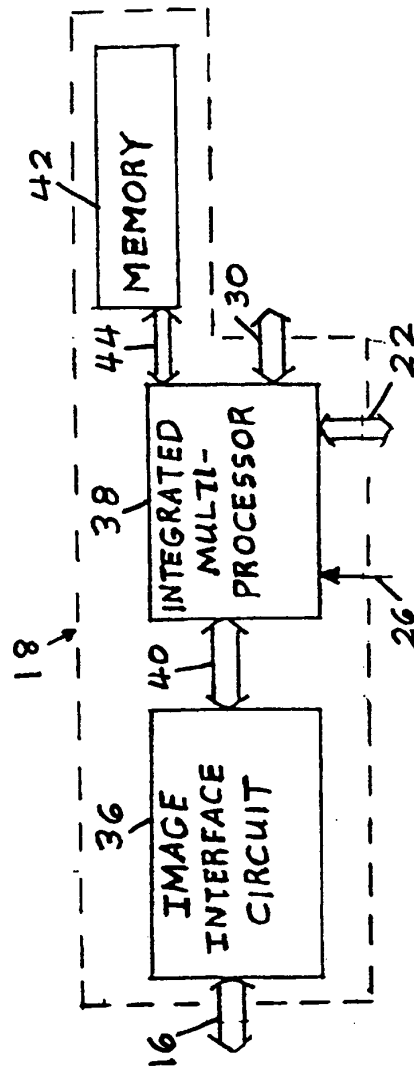


FIG 2

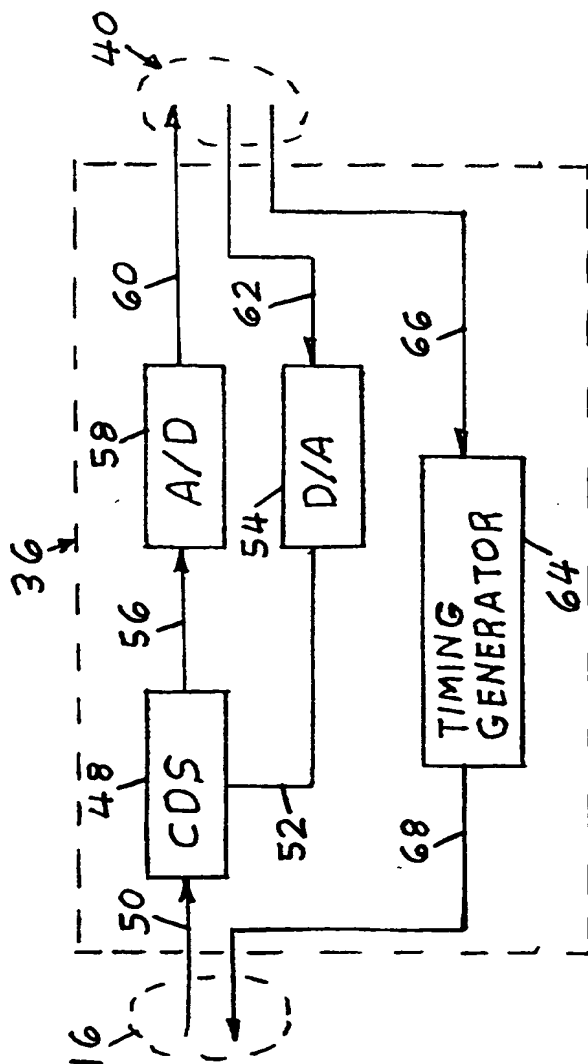


FIG 3

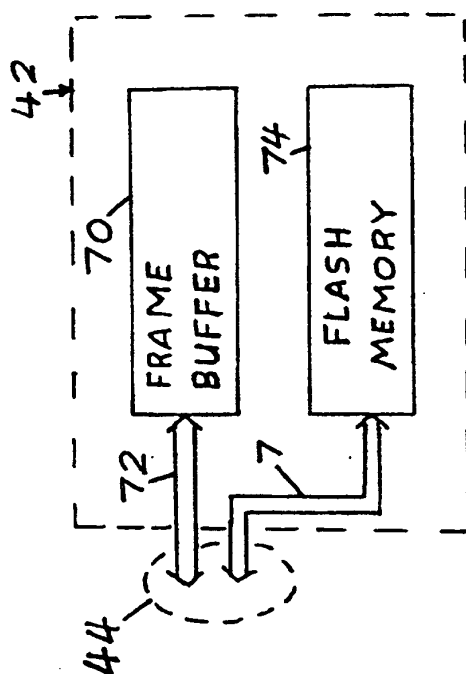


FIG 4

78

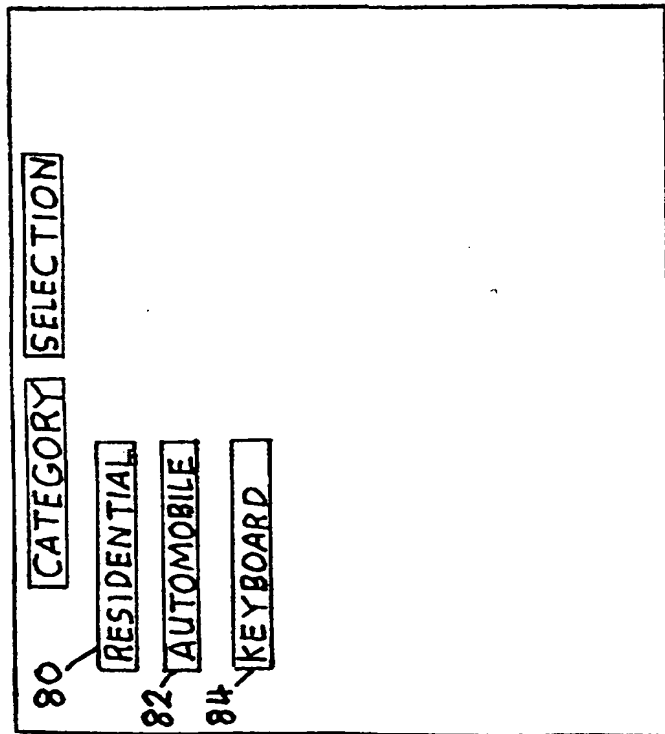


FIG 5

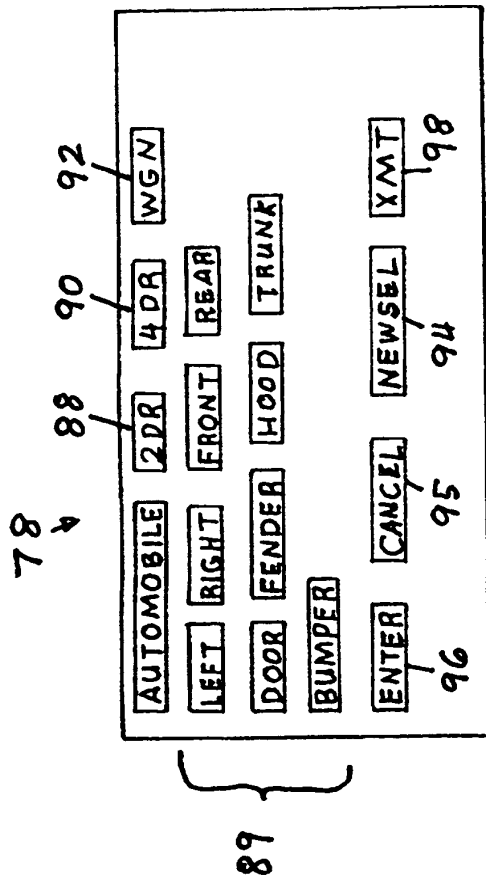


FIG 6

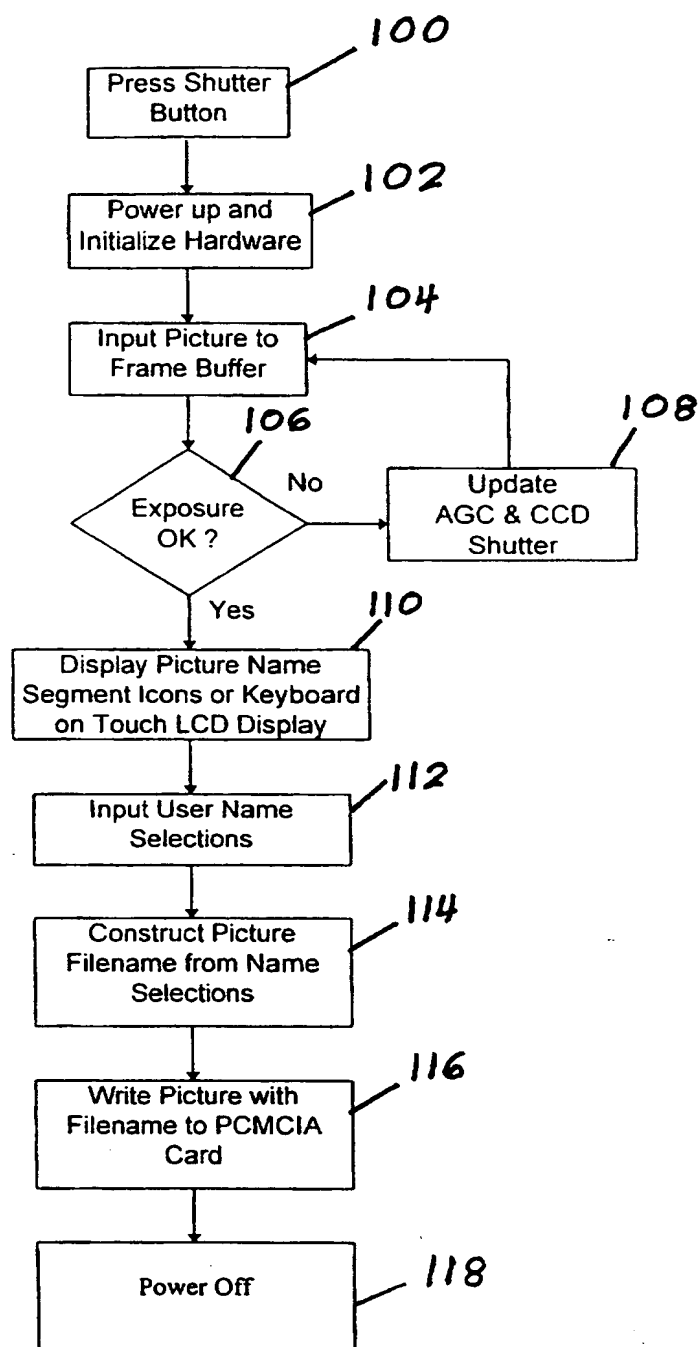


FIG 7

INTERNATIONAL SEARCH REPORT

International application No.

PCT/US97/00460

A. CLASSIFICATION OF SUBJECT MATTER

IPC(6) :H04N 5/262

US CL :348/239, 552, 589

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

U.S. : 348/207, 231, 232, 239, 333, 334, 552, 589, 601

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APS

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X -- Y	US 5,124,814 A (TAKAHASHI et al) 23 June 1992, col. 2, lines 55-68, cols. 3 and 4.	1, 2 ----- 3-17
X --, P Y	US 5,515,101 A (YOSHIDA) 07 May 1996, col. 2, lines 36-68, cols. 3.	1, 2 ----- 3-17
A,P	US 5,502,486 A (UEDA et al) 26 March 1996, cols. 4 and 5.	1-17
Y	US 5,475,441 A (PARULSKI et al) 12 December 1995, col. 3, lines 36-68, cols. 5 and 6.	3-6 , 8-10
A,P	US 5,576,757 A (ROBERTS et al) 19 November 1996, cols 4 and 5.	1-17



Further documents are listed in the continuation of Box C.



See patent family annex.

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